

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Kenji MORIMOTO et al.

Serial No.: New Application

Filed: March 20, 2002

For: FLIP CHIP PACKAGE, CIRCUIT BOARD THEREOF AND  
PACKAGING METHOD THEREOF

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application,  
please enter the following specification changes as noted  
below:

IN THE CLAIMS:

Please amend claims 3 and 4 as follows:

3. (Amended) The flip-chip packaging method according to  
claim 1, wherein said electrode material film remaining after  
development is trapezoidal in cross section that is wider as it  
goes farther away from said circuit board.

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4. (Amended) The flip-chip packaging method according to  
claim 1, wherein said circuit electrode is arc-shaped in cross  
section.

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REMARKS

Claims 1-6, as amended, remain herein. Claims 3 and 4 have been amended hereby.

This Preliminary Amendment is submitted to eliminate multiply dependent claims from the above-identified application.

Examination of this application on its merits is respectfully requested.

Respectfully submitted,

PARKHURST & WENDEL, L.L.P.

  
Roger W. Parkhurst  
Registration No. 25,177

March 20, 2002  
Date

Attachment:  
Mark Up of Amended Claims 3 and 4

RWP/ame

Attorney Docket No. YMOR:242

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CLAIMS

1. A flip-chip packaging method, wherein in flip-chip packaging a semiconductor element on a circuit board by using conductive resin, said element having protruding electrodes formed thereon, the method comprising:  
printing an electrode material containing photopolymerizable materials on a semiconductor element package region on said circuit board such that a film is formed with a prescribed thickness, and forming concave circuit electrodes by baking said electrode material film after performing exposure and development of said electrode material film to allow said electrode material film to remain only on prescribed electrode regions, thereby forming concave circuit electrodes having edges warped in a direction of going apart from the circuit board surface; and  
bringing said protruding electrodes formed on said semiconductor element into abutment with concave faces of said concave circuit electrodes, and connecting said protruding electrodes and said circuit electrodes with each other via the conductive resin.
2. The flip-chip packaging method according to claim 1, wherein said electrode material film is formed to have a dry film thickness of 10 to 20 micrometers.
3. The flip-chip packaging method according to claim 1-~~or 2~~, wherein said electrode material film remaining after development is trapezoidal in cross section that is wider as it goes farther away from said circuit board.
4. The flip-chip packaging method according to claim 1-~~or 2~~, wherein said circuit electrode is arc-shaped in cross section.
5. A flip-chip package in which a semiconductor element having protruding electrodes formed thereon is packaged on a circuit board by using conductive resin, wherein  
said circuit board includes concave circuit electrodes each having edges warped in a direction of going apart from the circuit board surface,  
said semiconductor element is disposed such that ends of said protruding electrodes thereof come in abutment with concave surfaces of said concave circuit electrodes, and  
said protruding electrodes and said circuit electrodes are connected to each other via the conductive resin.
6. A circuit board for flip-chip packaging a semiconductor element by using conductive resin, said element having protruding electrodes formed thereon, comprising concave circuit electrodes each having edges warped in a direction of going apart from the circuit board surface.